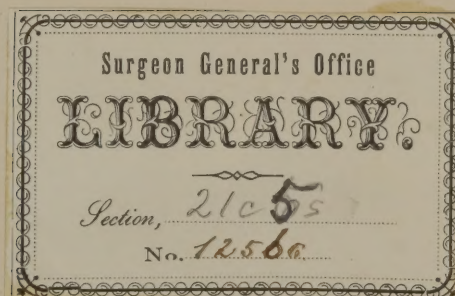


*Deane*  
*Deane*  
Carnochan (J. M.)







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# CASE OF EXSECTION OF THE ENTIRE ULNA.

DISEASED RIGHT ULNA EXACT SIZE.

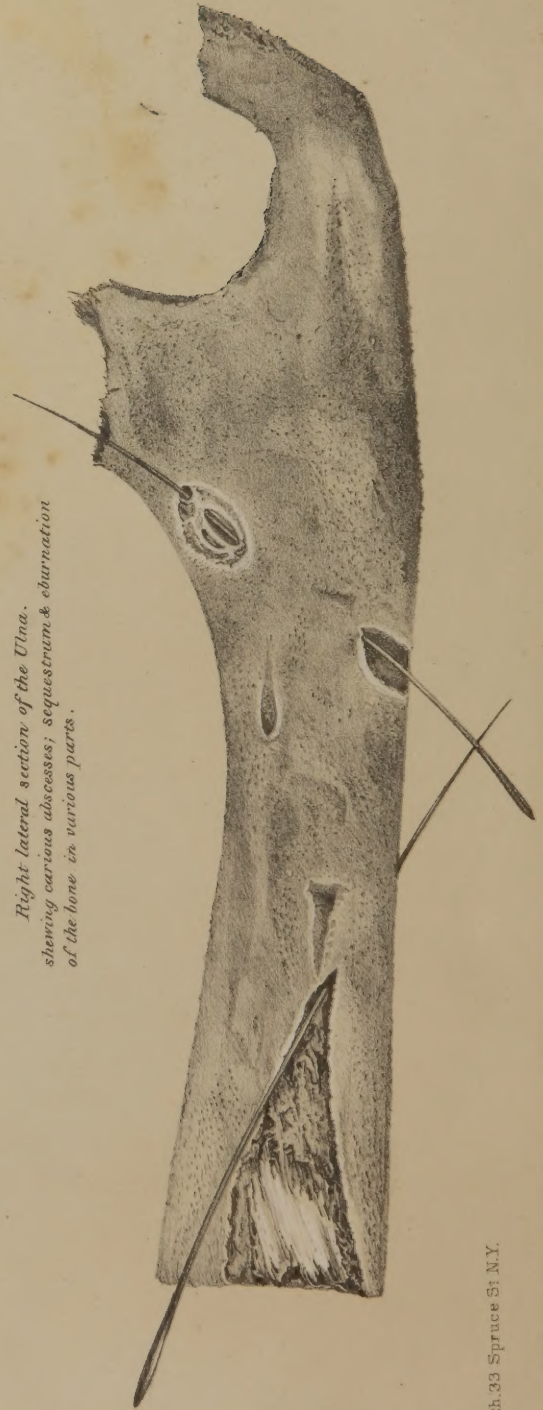
FIG. 1.

*Shows clavate, enlarged oval & round foramina, & acicular & mammillated formations, on the surface of the bone.*



FIG. 2.

*Right lateral section of the Ulna. showing carious abscesses; sequestrum & oburation of the bone in various parts.*





*Carnochan J. M.*

EXSECTION  
OF THE  
ENTIRE ULNA

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MODERN surgery is chiefly indebted for the revival of the exsection of bones, and for more precise rules regarding this class of operations, to Moreau, Percy, Champion, Pelletan, Dupuytren, Mott and Syme. Exsections of the long bones in continuity are not very uncommon; but, of their complete removal, the record is scanty. The methodical books refer to several cases, but in such a manner as to leave it doubtful whether the exsections were total or partial. Besides, when the original reports are consulted, it frequently appears that the summary statements, made on their authority, are not fully justified, and that they err either in regard to the extent of the operation said to have been performed, or some other particular of importance to the inquirer. Coming down to a recent period, I have already described, at length, a case of the removal of the entire lower jaw, at both temporo-maxillary articulations, by a single operation, with a satisfactory result; and the following case shows that the Entire Ulna can be removed, and the functions of the upper extremity retained, in nearly their original perfection.

CASE.—P. Cavanagh, a native of Ireland, aged 30, of sanguineous temperament, and small stature, strumous aspect, without syphilitic taint, a shoemaker by trade, while splitting wood with a heavy axe, sprained his arm so severely, that, as he expresses it, the sinews seemed to give way. During the night following the accident, he was awakened by intense pain about the region of the wrist joint. This was speedily succeeded by swelling of the



upper and forearm, as high up as the humero-scapular articulation. In this condition, he consulted a physician, who prescribed an anodyne liniment, to be applied to the arm. The application was used for five weeks, without abatement of the pain. Fomentations of hop leaves were then resorted to. These failing to bring relief, and the malady still progressing, the patient sought the advice of Dr. Webster, of Geneva, who made along the arm two deep incisions, which were followed by a slight discharge of pus and much blood. Cataplasms were then used for about eight weeks, with no relief to the pain or diminution of the tumefaction. In the month of July, 1852, Cavanagh entered as a patient the surgical division of the State Emigrants' Hospital.

At the time of his entrance he was much enfeebled and emaciated; the presence of irritative fever showed that the constitution was sympathizing with the local disease; the hand, forearm, arm, and shoulder presented one dense, hard, tumefied, and shapeless mass, of a purple hue, and extremely sensitive when handled; the pain was unremitting, being more severe by night than by day; the circumference of the diseased forearm was three times greater than that of the corresponding portion of the healthy arm; and the density of the tissues was such, that, in connection with the wan and emaciated aspect of the patient and the purple hue of the integuments, there was reason to conjecture that the disease was one of malignant character. A lotion of acetate of lead and tincture of opium was ordered to be kept on the arm, which was also to be enveloped in oil-silk. Quinia, porter, and good diet were likewise ordered.

August 1st, 1852. Three weeks having elapsed, and the tension and swelling still remaining unabated, free and deep incisions were made through the tissues of the forearm; but the relief obtained by this operation was but momentary. The arm was now kept enveloped in a flax-seed cataplasm, with which was incorporated some extract of stramonium. During the months of September and October, the constitutional treatment was but little varied. Iod. ferri and iod. potassii were at times substituted for the quinia; an anodyne draught of morphia was regularly given at bed-time. The topical applications consisted alternately of cataplasms, anodyne liniments,



anodyne fomentations, *eau sedative*, and extract of stramonium. While this treatment gave no relief to the pain, several abscesses had formed along the ulnar region of the forearm, and these openings left sinuses leading to the ulna; which, by means of the probe, could be felt denuded of its periosteum.

The diagnosis now became more precise, and his card was ordered to be marked "Ostitis, caries and necrosis of the ulna, possibly, also of the radius." The general tumefaction, at this period of the disease, rendered it impossible to ascertain that one bone alone was affected. The patient deriving no benefit from the use of the various medicamentals means which had been resorted to, was recommended to remove from the Hospital to the country, for a change of air, and, at the same time, was directed to use tonic remedies and a generous diet. The patient consequently took his discharge from the Hospital, December 1st, 1852.

On the 18th May, 1853, he was again admitted, having in the interval followed the instructions he had received. The shoulder and upper arm were now found to have resumed their normal appearance and size; but the elbow joint was very much enlarged, and almost incapable of motion. The forearm was still dense and hard, and was, moreover, much increased in size, presenting along its ulnar aspect a purplish hue, with various openings and sinuses, from which, at times, small portions of dead bone had been eliminated during the patient's absence from the Hospital. The wrist joint was also limited in its movements, and supination and pronation could not be performed. The general health was somewhat improved, but the constitution still showed signs of participation in the local malady, and a dull and aching pain continued to extend along the arm towards the axilla.

The indications of treatment, now, were to keep up and improve the general tone of the system, and to use, topically, anodyne applications, in conjunction with ioduretted preparations. To this end, during the following seven months, the constitution was supported by the internal exhibition of quinia, carb. ferri. precip., iodide of potassium, syr. iodide of iron, sarsaparilla, infusion of prunus Virginiana, wine, porter, generous diet, &c.; while locally, anodyne and ioduretted cataplasms, fomentations, unguents, and the warm bath, were sedulously employed. But, from this treatment, no per-



ceptible amelioration was obtained; the arm was still much tumefied and hard; the sinuses remained unclosed, discharging daily considerable quantities of purulent material, in which, at times, were found minute portions of diseased bone. At this time, also, January 1st, 1854, the ulna could be more distinctly traced, and felt to be enormously enlarged—apparently through its whole extent; but there was good reason to infer, as no sinus could be traced to the surface of the *radius*, that this latter bone was entirely sound.

Medicamental and dietetic treatment had now been used for nearly two years; the arm was still useless, and a painful incumbrance; and the ultimate cure of the malady appeared to be beyond the resources of medicinal art. The patient was becoming impatient, and anxious to obtain relief. The resources of operative surgery seemed now to offer the only prospect of attaining a serviceable result; and, as a point of practice, the alternative presented itself of amputation of the arm above the elbow, or of exsection of the entire diseased bone. From some recent investigations, which I had been prosecuting upon the lower animals, I had convinced myself that the entire ulna, although forming an important part of the elbow-joint, could be removed, without materially impairing either the strength of the limb or freedom of its movements. Accordingly, I gave the preference to exsection of the bone, and performed the operation on the 14th January last.

OPERATION.—The patient was brought into the amphitheatre, and placed supine upon the operating-table. The assistants were arranged so as to maintain firmly the trunk and lower extremities, and be in readiness to hand the instruments and to sponge the wound. Chloroform was cautiously administered. While under the full influence of the anæsthetic, the position of the patient was changed, so that he lay partly on the left side.

One assistant held and supported the upper arm of the diseased limb, compressing at the same time the humeral artery; another, seizing the hand and wrist, rotated inwards the limb from the shoulder-joint, and carried the pronation of the forearm so far as to cause the palm of the hand to look directly outwards. The elbow-joint was now slightly flexed, and the hand elevated. This twisted position of the ulna upon the radius placed the ulna



upon the posterior and outer aspect of the forearm, and rendered it more easily accessible.

The limb thus placed, the assistants maintaining the arm and forearm steadily, standing upon the right side of the patient and placing the fingers of the left hand upon the integuments of the forearm towards the elbow, with a strong, straight, sharp-pointed bistoury, I made an incision along the posterior and inner aspect of the ulna; commencing at the lower part of its superior third and extending downwards to a point over the extremity of the styloid process. This divided the tegumentary layers and facia, which were found dense, matted and infiltrated. The tendon of the *extensor carpi ulnaris* was pulled back, and the bone exposed. This was found rough, greatly enlarged, and presenting numerous oval foramina and several cloacæ, which communicated externally through the integuments. It was now apparent that the bone must be disarticulated. To effect this at the carpo-ulnar articulation, a transverse incision, about an inch long, parting from the lower extremity of the first incision, was made across the back of the wrist. The superficial tissues were here reflected, and the tendon of the *extensor carpi ulnaris* was carefully detached from its groove on the lower part of the ulna. The dissection was now carried along the anterior surface of the lower portion of the ulna, and the soft parts were detached from the bone as far as the interosseous ligament, the ulnar artery and nerve being carefully avoided. The soft parts were now detached from the posterior surface of the ulna, avoiding injury to the extensor tendons. An attempt was then made to pass a chain-saw around the ulna through the interosseous space opposite the lower part of the middle third. This was found impossible, on account of the approximation of the enlarged ulna to the radius, and the almost complete obliteration of the interosseous space. To divide the bone at this point, a small convex-edged saw was used. The bone thus divided, the interosseous ligament was detached downwards, and the lower fragment of the ulna was disarticulated from its inferior attachments to the radius, fibro-cartilage and the carpus.

It now remained to insulate and detach the upper fragment. The first incision was prolonged upwards along the posterior surface of the ulna,



so as to end at the upper part of the olecranon, opposite its outer edge. To this a terminal incision was joined, which extended transversely across the back of the elbow-joint, as far as the inner margin of the ulna. The soft tissues were now dissected from the bone, upon its posterior and anterior aspects, as far as the interosseous ligament, and as high up as the insertion of the *brachialis internus* muscle. The bone was next seized and pulled from the radius; and a knife, curved flatwise, was passed close upon its interosseal margin, grazing the bone, and dividing the interosseal membrane, upwards; the soft parts being held apart, and the interosseal and ulnar arteries protected.

The elbow-joint was now flexed, and opened behind, by entering the bistoury close to the inner edge of the olecranon. The attachment of the triceps extensor was next divided, by cutting directly outwards. The ulnar nerve was now found, and hooked aside, until farther dissection of the soft tissues was effected from the inner aspect of the joint and the upper part of the bone. The lateral ligament was next divided. The bone still remained firmly attached, chiefly by the coronary ligament and the insertion of the *brachialis anticus*. The ulna was carried backwards, so as to make that muscle tense, and by carefully grazing the coronoid process with the knife the tendon was detached. Some difficulty was here presented in avoiding the humeral artery, which lay in close proximity to the enlarged coronoid process. The bistoury was now passed between the ulna and radius, and the coronary ligament divided. A few remaining fibres were divided, and the bone was completely detached.

During the operation there was a considerable flow of venous hemorrhage, which ceased upon removal of compression from the upper arm. The arterial bleeding was arrested by torsion of a few arteries around the elbow-joint. The operation was performed in the presence of many pupils and professional gentlemen; and I was ably assisted during its different steps by Dr. Gülek and Dr. Melville, of this city, and by Drs. Hensley, Gould, Harris, and Thomas, the Resident Assistant Surgical Staff of the Hospital.

PROGRESS OF UNION.—After the operation, the wound was cleansed of



coagula, and the edges brought together by ten points of interrupted suture. The limb, after the dressing and bandage were applied, was placed, prone and slightly flexed, upon a well-padded splint, and fixed to this by circular strips of bandage. The patient recovered slowly from the influence of the chloroform, the pulse remaining below 50 for some hours: anodyne ordered at bed-time: next day, Jan. 15th, the pulse 100—full and regular: oozing of blood has occurred to some extent: during the night, patient has been restless, and has suffered much pain in the arm: sol. sulph. morph. at bed-time.

Jan. 16th. Pulse 100—not so full or strong: no more oozing of blood has occurred, and the patient feels more comfortable, having slept, and suffered but little during the night: the first dressing removed in the afternoon: for four inches above the wrist-joint, the wound seems to be uniting by first intention.

Jan. 17th. Pulse 83—regular: general condition good: Ol. ricini ordered: the wound dressed: suppuration profuse: the lips of the wound have an unhealthy aspect: four of the sutures come away: anodyne in the evening: the patient is ordered to commence in the morning with solution of sulphate of quinia.

Jan. 18th. Patient has slept badly, having suffered much pain, during the night, along the arm: pulse 80: dressed the wound, which has assumed a better appearance: suppuration less, but little adhesion: beef-tea ordered.

Jan. 19th. Pulse 90: patient has slept tolerably well: wound dressed: discharge of pus decreasing, and union progressing from the wrist upwards: free discharge of synovial fluid from the elbow-joint, upon removal of the dressing.

Jan. 20th. Pulse 84: wound dressed: favorable progress: full diet allowed: quinine continued: no undue inflammatory action at either articulation: arm still kept in the same position.

Jan. 21st. Patient has suffered much pain at the elbow-joint during the night: in the afternoon, wound dressed: doing well: there is free motion



at both elbow and wrist-joints : discharge of synovia still coming from the elbow-joint.

Jan. 22d. Everything going on well : wound dressed : but little discharge, except at the several tegumentary orifices which existed between the wrist and elbow before the removal of the bone : but little synovial fluid coming from the joint.

Jan. 25th. General condition of the patient excellent : pulse 80, and natural : appetite good : only slight oozing of synovia from the elbow : no pain : splint upon which the arm rested, in a state of pronation, dispensed with ; forearm now bent at a right angle, and held in a position between supination and pronation, while a light, well-padded splint, extending from the elbow to the extremity of the fingers, is placed and bandaged along the front thereof, to support the radius : limb, thus adjusted, supported by a sling passed around the neck : patient allowed to sit up.

Jan. 29th. First splint removed, and the arm, which had been maintained fixed for the last four days, adjusted, and bandaged to another splint, jointed and formed of two pieces ; one for the upper arm, and another for the forearm ; the joint being opposite the elbow, in front : by this arrangement, the forearm still kept in semi-pronation, and radius supported ; while by regulating the angle of the splint, by a mechanism for that purpose, the forearm can be gently and gradually extended.

Feb. 5th. During the use of both splints, dressings carefully attended to, by removal and re-adjustment at suitable intervals : to-day, upon removal of the splints and dressing, healing process of the wound found to be entirely completed ; the tissues about the wrists and elbow-joints being entirely consolidated, and free motion at both articulations possible by the patient himself, without any assistance.

Feb. 10. Limb still supported by a light bandage, and by the last splint ; for the purpose of allowing the tissues along the line of the inner aspect of the forearm to become further consolidated : health of the patient is now good : he walks about like a well person : he is still upon tonic treatment, and is allowed generous diet.



Feb. 15th. Removed the splint: patient allowed to use his arm: general health entirely restored.

Feb. 18th. Five weeks after the operation, discharged from the Hospital cured.

APPEARANCE OF THE ARM; AND ITS FUNCTIONS.—With the exception of a depression, and the cicatrix along the ulnar aspect of the forearm, there is no deformity of the limb.

The functions of the arm are preserved in a remarkable degree of perfection. The power of prehension is unimpaired: flexion and extension at both the elbow joint and at the wrist joint can be performed with facility: supination and pronation can also be effected: abduction and adduction at the wrist joint can be performed, as also flexion and extension of the fingers, as before the operation: sensation and nutrition are as perfect as in the arm and hand of the opposite side.

None of the large nerves or arteries were injured during the exsection of the bone, and the muscular tissue was carefully preserved from the action of the bistoury, with the exception of the cubital origin and insertion of those muscles which are attached to the upper portion of the ulna. These had to be divided during the detachment of that portion of the ulna.

Flexion, at the elbow joint, is chiefly effected by the *biceps flexor*, which is inserted into the tubercle of the radius; but the humeral origin of the other flexor muscles—such as the *flexor sublimis digitorum communis*, the *flexor carpi ulnaris*, the *palmaris longus*, the *flexor carpi radialis*, and the *pronator radii teres*—remaining uninjured, they also serve as auxiliaries in this function.

The *triceps extensor* and *anconæus* were, necessarily, entirely detached during the operation; but extension of the forearm is sufficiently performed by the action of the *extensores carpi radialis longus et brevis*; by the *extensor communis digitorum*, the *extensor minimi digiti*, and by the *extensor carpi ulnaris*; all of which muscles pass from the external condyle of the humerus, to be inserted on the posterior surface of different metacarpal and phalangeal bones of the hand.

Flexion of the wrist joint is effected by *flexor carpi radialis*, *palmaris*



*longus, flexor carpi ulnaris*; extension, by the *extensores carpi radialis* and the *extensor carpi ulnaris*. Adduction, also, is effected by the *extensor carpi ulnaris*; while abduction results from the action of the *extensores carpi radialis*.

Flexion of the fingers is chiefly effected by the *flexor sublimis digitorum communis*, and the extending function of the phalanges results mainly from the action of the *extensor communis digitorum*.

**PATHOLOGICAL CONDITION OF THE BONE.**—The diseased ulna is delineated in the plate, Fig. 1, and presents all the characteristic manifestations of prolonged inflammatory action of a high grade. The bone is very much expanded from one extremity to the other—at the base of the coronoid process it measures in circumference  $5\frac{1}{2}$  inches; and its weight is 8 oz. minus 20 grs., the weight of a recent, healthy, adult ulna varying from  $2\frac{1}{2}$  to 3 oz.

Bony vegetations have assumed the acicular form on the radial aspect of the bone, on a line with the attachment of the interosseous ligament, as far down as the junction of the middle with the lower third; the acicular formations also prevailing on and below the coronoid process. At all other points around the upper extremity of the bone, irregular mammillated appearances exist, with innumerable enlarged, round, and oval foramina. These enlarged foramina, in conjunction with the hypertrophied condition of the bone, are characteristic signs of protracted inflammatory action, as was long ago demonstrated by the Goodsirs, of Edinburgh.

Along the inner and posterior aspect of the bone exist some eight *cloacæ*, five of which are in the upper third of the bone: two in the middle third; and one near the styloid process. One of these *cloacæ*, situated between the coronoid and olecranon processes, communicates with the interior of the elbow joint; while another, situated at the lower part of the bone, communicates with the ulno-carpal articulation.

The other *cloacæ* pass deeply into the interior of the bone, ramifying extensively, like sinuses, in different directions, along the inner texture; some of the sinuses containing portions of bone in a state of necrosis, and more or less detached. From these *cloacæ*, which opened externally upon the



integumentary surface, large quantities of purulent fluid, mixed at times with portions of dead bone, were discharged.

At the middle third, the circumference of the bone, by measurement, is four inches ; being  $\frac{5}{8}$  inches larger than the shaft of an adult femur. At this part, also, the round and oval foramina are abundant.

The lower third of the bone is also extensively hypertrophied ; being at its upper part  $3\frac{3}{8}$  inches ; while, at the base of the styloid process, the circumference is  $2\frac{5}{8}$  inches.

The section of the bone, as represented in the plate, Fig. 2, shows the appearance of the central portions. Here the influence of high inflammatory action, and its consequences—carious ulceration, necrosis, and eburnation—are plainly manifested. The greater part of the interior of the bone is exceedingly dense and compact. The surface of the osseous section is in some parts tinted with a dark purple hue ; at other parts, it is whitish and dense, like ivory ; blastema having been here thrown out, so as to obliterate the spongy structure, the Haversian canals, the lacunæ, and canaliculi. The right lateral half of the section, [as seen in Fig. 2,] also, shows the presence of two carious abscesses in the interior of the bone, communicating externally with cloacæ and the integuments. In one of these abscesses, a piece of sequestrum is situated, partly detached. Vide plate, Figs. 1 and 2.



REMARKS  
ON  
NEURALGIA OF THE FACE.  
WITH A CASE.

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NEURALGIA, wherever seated, has its phases, and gradations—its different degrees of intensity—manifested by pains of a trivial character, or by the most excruciating suffering. These pains are, rarely, continuous, are generally intermitting or remitting, and are most frequently accompanied by twitchings or convulsive muscular movements. “*Aut leve malum quamvis intermittet, quamvis exiguum esse prima specie videtur, nam si acute interdum impetum faciat, fœda atque atrocia detrimenta affert.*” We find these words in Aretæus, who seems to have been the first to present definite ideas in regard to Neuralgia of the Face, and to have thus early designated the violent symptoms of the disease, as seen in its highest degree of development, as well as those milder symptoms which are presented, in a great number of cases.

The allusions made by previous authors, to this form of Neuralgia, are superficial and vague. In their writings are found observations which treat of pains of the head, confounded, however, in a general description.

It is only within a comparatively recent period, that Neuralgia of the Face has attracted the serious attention of medical authors; or, perhaps it may be more properly stated, that the malady has been surrounded by such obscurity and perplexity, as to have baffled description.

André, a French surgeon, in 1756, published his researches upon this

malady, and gave to it the name of Tic Douloureux. According to this writer, the affection is characterized "*par une douleur plus ou moins vive, et par des grimaces hideuses qui mettent un obstacle invincible à la réception des aliments, qui éloignent le sommeil, interceptent et lient souvent l'usage de la parole : agitations qui, quoique vagues et périodique en elles-même, sont néanmoins si fréquentes, quelles se font sentir plusieurs fois dans un jour, dans une heure, et quelque fois sont sans relâche et se renouvellent à chaque minute.*" This description, as far as it goes, refers to the disease when it has acquired a high degree of intensity, and coincides with the malady which Fothergill, soon after (in 1782), described under the name of "Painful Affection of the Face." The account given by Fothergill is more complete, and exact, than that of the French surgeon, just named, as we may learn by the following extract :

"From imperceptible beginnings, a pain attacks some part or other of the face, or the side of the head ; sometimes about the orbit of the eye, sometimes the *ossa malarum*, sometimes the temporal bones, are the parts complained of. The pain comes suddenly and is excruciating ; it lasts but a short time, perhaps a quarter or half a minute, and then goes off ; it returns at irregular intervals, sometimes in half an hour, and sometimes there are two or three repetitions in a few minutes.

"The kind of pain is described differently by different persons, as may be reasonably expected ; but one sees enough to excite one's compassion, if present during the paroxysm.

"It returns full as often in the day as in the night. Eating will bring it on some persons. Talking, or the least motion of the muscles of the face, affects others ; the gentlest touch of a hand or handkerchief will sometimes bring on the pain, whilst a strong pressure on the part has no effect."

About the same time that Fothergill's Memoir appeared, Thouret, another French writer, published an article, on this subject, in the *Mémoires de la Société Royale de Médecine*. This writer states, that the disease appears to fix itself, particularly, in certain localities of predilection, "*comme la mâchoire inférieure, le trou mentonnier, le voisinage de l'apophyse Mastoïde et la région de la joue la plus voisine de l'œil.*" *En général*, he adds, "*le siège le plus ordinaire du mal est sur le*



*côté du nez, immédiatement au-dessous de l'os de la pommette, à l'endroit où une branche principale du nerf maxillaire supérieur sort du canal sous-orbitaire."*

The authors, heretofore alluded to, contributed by their observations, chiefly, to the symptomatology of this disease.

Chaussier, guided by his anatomical knowledge, made some steps of advancement in determining the seat of Neuralgia of the Face. In his "*Table synoptique de la névralgie*," (Paris, an XI.), he makes four principal divisions of Neuralgia of the Face, according as the disease seems to be concentrated upon one, or other, of the branches of the fifth pair of nerves, or, upon the facial nerve proper, itself. Thus, he describes separately—*frontal neuralgia*, *infra-orbital neuralgia*, *maxillary neuralgia*; and, in a note, he admits the existence of neuralgia of the *facial nerve*. The course of the tri-facial nerve, and its anastomoses, have evidently formed a basis of this classification.

Since the publication of Chaussier, several dissertations and theses have appeared, at different times, in which new cases are related, but without the addition of any novel information on the subject.

In 1834, M. F. Bellingeri, of Turin, published a memoir upon Neuralgia of the Face, the chief features of which are his advocacy of an intermittent form of neuralgia, and the theoretical division of neuralgia into three species—the *inflammatory*, the *irritative*, and the *nervous*; the first species being again subdivided into the *sanguine*, the *phlogistic*, and the *rheumatismal*.

In more recent times (1835–36), the question has been agitated, by M. Bérard, as to the existence of a neuralgia of the *facial nerve* proper. This physiologist has arrived at the conclusion that the nerves of the *fifth pair* alone, in the face, can be attacked with this malady. Upon the other hand, in a later publication, M. Jobert de Lamballe supports an entirely different opinion, and maintains, that all the nerves of the face are liable to be attacked by neuralgia. In regard to this last point of discussion, we are aided in arriving at a correct conclusion by anatomical facts, as well as by the morbid phenomena which are frequently exhibited in neuralgia of the face. The *portio-dura*, or facial nerve, is undoubtedly a nerve, purely of motion, at its origin; but, before it emanates from the stylo-mastoid foramen, it has been joined by a sensitive branch from the ganglion of Meckel. Physiologically, after

this junction, the facial nerve must be a mixed nerve, and must be sentient to impressions, both normal, and abnormal. In fact, I consider that the facial nerve is not only the seat of neuralgia, at times, but that it is frequently the conductor of neuralgic phenomena, and morbid sensibility, to the nervous periphery of the face, when the true seat of the disease is located on the trunk of the second branch of the fifth pair. I make this statement, partly from observation, and partly from the consideration of the law which regulates the propagation of nervous sensibility, viz., that the sensation is referred to the periphery of a nerve, or to its extreme branches, when the trunk is the seat of irritation, or disease. A simple illustration of this is found in the effects which follow a blow impinging upon the ulnar nerve at the elbow. It is well known that the impression imparted to the trunk is conducted to the ultimate distribution of the nerve, and that the sensation is referred to the little finger, and to the ulnar border of the ring finger.

By reference to the history of this disease, we find, that notwithstanding its formidable character, and the numerous attempts made to unravel its pathology, science has not been as much enriched, as might be supposed, with facts observed with care and precision. With the exception of the discoveries of Charles Bell, and others, in relation to the functions of the nerves, which are implicated in Neuralgia of the Face, and some vague and unsatisfactory therapeutic experiments, we have made but little advancement, in regard to the nature and management of this disease, since the time of Fothergill.

As yet, authors differ concerning the anatomical lesions which should be considered as characteristic of Neuralgia of the Face. Some deny that any are to be found in those cases where the signs of the disease have been indicated in an incontestible manner; and one of the latest writers expresses himself in the following indefinite language: "*La névralgie tri-faciale doit être considérée comme une lésion de fonction donc nous ignorons entièrement la cause organique.*"

The medical treatment, although embracing a vast number of therapeutic agents, is most frequently unavailing; and it is well known, that the surgical treatment, consisting principally of topical applications, and the division, on the face, of the branches of the fifth pair, at their exit from their respective



foramina, is, for the most part, utterly useless in affording relief, or, at best, affords but very temporary benefit. The medical inquirer, then, has no reason to be satisfied with the observations heretofore made; but, on the contrary, is justified and urged in bringing under scientific scrutiny such new facts as may assist in unveiling still further the mysteries which envelope this most painful malady.

In the year 1811, a letter appeared, in the *Philadelphia Medical Museum*, written in 1807, by Dr. Jones, an eminent physician, of that time, in the city of New York, and addressed by him to the celebrated Dr. Benjamin Rush. This letter is a statement of Dr. Jones' own case, he having been, for many years, a victim to intense neuralgia of the face. The narrative is drawn up with much clearness of expression, and is worthy of insertion here, as emanating from a highly intelligent source, and as presenting a most graphic description of the excruciating and fearful agony experienced by those who are afflicted with the intense form of this disease.

Dr. Jones' letter runs thus :

"NEW YORK, Oct. 15th, 1807.

"About the middle of July, 1806, I began to feel an uneasy sensation in the gum of the upper jaw, on the right side, at a point whence one of the molares, in a loosened state, had a long time before been taken away; the socket of which, however, had already been absorbed or filled up, and the gum, or alveolar border of the jaw, was even, firm, and apparently sound; yet whenever I washed my face, or moved my hand gently over the cheek, a latent disease was perceptible. It gradually increased, till it became so extremely painful, that at times I was compelled to cry out with the intolerable anguish it occasioned. Eating, drinking, speaking, hawking, and spitting, sneezing, coughing, and blowing the nose, would either of them, in a moment, awaken the most poignant and acute pain. Even touching the eye with the finger, slightly rubbing the forehead, putting on a pair of spectacles, or only opening the mouth wide, would excite a return of the pain. Taking into the mouth anything hot, cold, or acid, was sure to produce the effect with aggravated violence. The necessary mastication forbade the use, in a great measure, of solid food. Combing the hair, shaving the right corner of the mouth,

reading aloud, or anything that gave the slightest motion to the muscles of the face, would occasion in the part a throbbing, which seemed to begin like the vibration of a musical cord, extending its effects to the cheeks, the eye, the nose, up to the scalp on that side of the head, and, after continuing for a few seconds, sometimes a few minutes, and latterly for fifteen or twenty minutes, it would cease, and the part which had been affected would then feel as well as if nothing had happened. The pain at length began to be felt severely, upon touching the left eye, yet, whatever it was that excited the pain, it always centered in the gum, on the right side of the upper jaw.

"It continued in this way; except increasing in the duration of each, paroxysm, till August 28th, 1807, when it almost, or entirely left me, and I began to flatter myself it had been vanquished by the use of hemlock; but in two or three days it returned, and became as violent and excruciating as ever. The gum where the disease is seated, I have already mentioned, is to all appearance perfectly well, sound and smooth, with no visible vestige of disease about it; and there had been no tooth in the spot for some considerable time before the disease commenced. The gum has been repeatedly divided by numerous longitudinal and transverse incisions down to the bone. This operation, in the beginning of the complaint, never failed to assuage the pain for a time; but the relief seldom lasted till the gum had healed. Electricity was tried for a long time, to no purpose. A number of topical applications were made; the part was covered with a blister externally, and various embrocations applied to the cheek without advantage. Opium was taken in large quantities, and the tincture applied to the part, both externally and internally. Warm and cold bathing were alternately applied to the head and face. The latter application occasioned the most exquisite misery. Peruvian bark in substance was taken in large doses. Huxham's tincture of the bark, with wine, was used very liberally. The volatile alkali, in a decoction of bark, was taken agreeably to Dr. Fothergill's prescription, in a recent publication of the *successful* treatment of a case of this very formidable disease. None of those things effected any change that promised the final removal of the complaint. I then began a steady use of the extract of hemlock, taking one grain night and morning, till I had risen to the quantity of four-



teen grains every four hours. This was continued till September 22d, 1807, when, finding it produced no diminution of the pain, I omitted the use of it for one week, when, the pain recurring more frequently, as well as more severely than before, I again had recourse to the hemlock, and am now, without much benefit from it, or very sanguine hopes in its curative efficacy, still persevering in the daily use of it. I have been advised to have the actual cautery applied to the gum; but am apprehensive that so harsh and violent an application would bring on tetanus with all its alarming and distressful consequences, and have therefore concluded not to adventure upon the experiment.

"This complaint will be admitted, I presume, to be a nervous affection; but what remains mysterious, and seems to ask for explanation is, that if a local disease, cutting the gum all to pieces, dissecting and dissevering it in all directions, should not, by dividing the nerves and insulating them from all connection with the sensorium, destroy their sensibility, or at least their power of *communicating* pain. I am aware that while their continuity is preserved, denudating the nerves, so as to expose them to the contact of the common air, does often cause them to assume a morbid action productive of extreme pain; but this did not happen in the present instance, for, when the scarifications did least good, they did not seem, in the smallest degree, to increase the evil.

"I am upwards of sixty-two years of age, and, except this complaint, my general health and appetite are good; I have, indeed, a small ulcer in one of my ankles, which has been healed, but from irritation has broken out again, and at present does not seem much disposed to cicatrize. I have, during my whole life, been in the habit of using steady exercise, and have lived as regularly and as temperately as any man.

"If, sir, on considering this case, which has thus far eluded the best professional skill of this city, anything occurs to your mind, which would throw light on the nature and character of my complaint, and especially if your extensive research and experience should have furnished you with anything promising for the treatment of it, by communicating your opinions and prescriptions, you will not only give to the world a new proof of your pre-emi-

ment skill, but you will at the same time subserve the interests of humanity, by administering comfort and relief to an old man, suffering under the most afflictive distress ; you will cause his winter sun, now dimmed and clouded with despondency, to shine out afresh, with a mild and cheering ray, and at last go down in a serene sky ; and, what may be of still more value in your estimation, you will enjoy the conscious merit of acting in conformity with the benign precepts and bright example of the *Great Physician*, who, while on earth, delighted in relieving the distresses of his brethren."

Dr. Rush replied to this letter, recommending such remedies as he supposed might be most effective in arresting the fearful disease. We learn, however, from the following extract, taken from another letter to Dr. Rush, written two years after the one just quoted, that all the remedies which were used, had proved unavailing. Dr. Jones, in his second letter, dated December 9th, 1809, thus alludes to his condition at that time. . . . "My disease, sir, still maintains its place, unmoved by all that weight, and force, and complication of machinery, which medical science and skill have devised and applied. The most promising and judicious prescriptions, derived either from enlightened reasoning, or from experience, or from learned research, have alike failed, in this baffling disease, to answer the expectations reasonably entertained of them."

I am informed by a venerable and esteemed physician, still living in this city, that Dr. Jones was afterwards subjected to the operation of division of the infra-orbital nerve on the cheek, but without receiving material benefit ; and further, that, unrelieved by any of the curative means he had so patiently resorted to, he succumbed under the prolonged and agonizing suffering which he had endured.

The following case is, in many respects, similar to that of Dr. Jones. The disease was of the infra-orbital nerve ; the suffering was as poignant and intense ; and the remedies resorted to were even more numerous. I know of no instance on record, where so much perseverance and fortitude were manifested by a patient, in urging, and in submitting to repeated operations of an extremely painful character ; for, as will be seen by the following history, besides the extraction of all the teeth upon the upper jaw, no less than twelve



operations were performed on the face, as a part of the treatment. This patient has been, however, so far more fortunate than the subject of the previous case, as to have been restored to comparative comfort and ease, from a condition bordering on insanity, and in which he had frequently meditated self-destruction.

*Case.*—J. C. Forbes, aged 47, a citizen of Hoboken, New Jersey, married, of nervo-bilious temperament, by occupation a master carpenter, applied to me for advice, in the month of August, 1855. He had, with the exception of his neuralgic affection, always enjoyed good health, and had no special taint of the system.

He stated that he observed the first signs of this disease in May, 1849. At that time, while passing a handkerchief across the upper lip and end of the nose, he perceived a sharp, poignant, lancinating pain, shooting from near the middle of the upper lip, on the left side, along the furrow, at the junction of the nose and cheek, up to the inner angle of the eye of the same side, and passing deeper through the bone of the cheek, in the direction of the sphenomaxillary fissure. The same pain was started when the upper lip was touched with the tip of the tongue, or when making an effort to swallow. These symptoms, assuming a paroxysmal character with irregular intermissions, continued unabated until the autumn of the same year, when they entirely disappeared.

In the spring of 1850, the attack was renewed, commencing as it had done the previous year, and gradually becoming more painful. It was supposed by some that the trouble might originate from disease of the teeth; and, by the advice of a dentist, all the teeth were extracted, except a small stump on the right side of the lower jaw. This proceeding gave no relief; the disease increased in severity; the paroxysms of pain became more frequent, and almost intolerable, extending over the entire left cheek.

From that time (June, 1850) until February, 1852, the patient continued under medical treatment; he gave up his business, and sedulously tried the most approved prescriptions; but, in vain.

Finding no relief from the use of internal remedies, as advised by skillful physicians, he consulted an Hospital surgeon, of eminence, in this city, with

the view of having an operation performed, if deemed expedient. An operation was advised, and performed (February, 1852), by dissecting, from the interior of the mouth, without external incision, the entire cheek from the superior maxillary bone ; the separation of the tissues extending across, from the nose to the prominence of the malar bone, and, vertically, from the alveolar border, as high as the margin of the left orbit. A considerable quantity of blood flowed while the incisions were being made. Much relief followed this operation, and the paroxysms seemed to be kept at bay for a period of about eight months.

The following November, the disease returned, with its wonted severity, and the patient was again put under medical treatment, using, chiefly, large doses of quinine. In the latter part of December, 1852, the paroxysms became so aggravated and intolerable, that the patient again entreated the same surgeon to perform another operation. This was accordingly done, by making a V incision, below the margin of the orbit, and dissecting the flap upward, so as to expose the infra-orbital foramen. The nerve was then divided at its exit upon the cheek. The patient was again relieved, until the autumn of 1853, when the pain returned, with severer manifestations than before. The patient was again put under medical treatment, galvanism being added, without any advantage, to the long list of therapeutic means previously resorted to.

In January, 1854, a Professor of Surgery, of some eminence, in this city, was consulted, and performed the same operation as that last described ; but, besides the incisions for dividing the nerve, he cauterized, with a red-hot iron, the divided surface of the nerve, at the infra-orbital foramen. Relief was again obtained, until August of the same year. During that month, the paroxysms reappeared with their previous intensity, and another operation, of a similar character, was performed, in September, by another surgeon, also of this city ; but, without any good result.

In October of the same year (1854), harassed, despondent, and worn out with the accumulated violence of his sufferings, the patient consulted my celebrated friend, Professor Mott. With the hope of affording relief, the tissues of the cheek were freely divided by sub-cutaneous incision, once in Octo-



ber, and again in November, by that distinguished surgeon. Very slight amelioration of the pain was effected by these operations, and, on the 8th of January, 1855, Professor Mott performed his third operation, by making a V incision on the cheek, in the same manner as had been previously done, and dividing again the nerve, at the infra-orbital foramen.

These numerous operations, although lulling the terrible suffering for a time, left no lasting impression on the disease. For nearly five months a partial mitigation of the symptoms followed Dr. Mott's last operation, but, in June, 1855, the pain set in afresh with its accustomed violence; and the patient, unable to attend to business, his means exhausted, his strong frame shattered with prolonged and intense agony, and his mind paralyzed with despair, took refuge in the New York City Hospital. There he remained, in the Medical Department, under the care of the physicians of that institution, until the month of August, 1855, when he took his discharge; having received no benefit from the treatment prescribed.

It was at this stage of the malady that the patient came under my notice. A few days after he left the Hospital, he was brought, by some of his friends, to consult me, in a condition bordering on delirium; wild, and almost mad, as he himself stated, with the intensity of his sufferings. He most piteously besought me to perform some operation for him, different from those previously tried; protesting that he was utterly regardless of any danger that might be incurred, or of the extent or character of the mutilation which might result.

After hearing a recital of the various operations to which he had been subjected, and seeing, from his condition, that nothing really useful had been accomplished, it seemed to me futile and hopeless to recommend an operation which would consist of the division simply of the nerve. As the catalogue of medicines of most repute in Neuralgia had been exhausted unavailingly, it was useless to repeat them, and ordering, for the moment, a strong dose of muriate of morphine, internally, and an ointment, composed of the extracts of belladonna, hyoseyamus, and stramonium, with a small proportion of veratria, I undertook to perform on him, the following day, the operation of exsecting a piece of the trunk of the infra-orbital nerve.

The condition of the patient, after his return home from the Hospi-

tal until he came to me for advice, was truly appalling, and enlisted the sympathies even of strangers. He could neither rest, sleep, eat, drink, nor talk, without the occurrence of paroxysms of the most violent character. He would start from his couch with the wildness of a lunatic, and would throw himself on the floor, screaming and howling from the intensity of his agony. At times, his suffering would overcome his moral courage, great as that was, and he would threaten self-destruction. The slightest impressions on the external surface of the face, especially on the upper lip or cheek, or upon the mucous lining of the mouth, pharynx, or nose, would bring on, most commonly, paroxysms of the most aggravated description. The intermissions between the paroxysms, during the exacerbations or attacks of the disease, were variable; sometimes lasting a half-hour or more, sometimes a few minutes, and at others only some seconds.

On the 31st of August, 1855, I performed the following operation on Forbes. He was seated on a chair in a good light, and, the assistants being properly arranged, he was put under the full influence of chloroform. A V-shaped incision was made, the base towards the margin of the orbit, and embracing the infra-orbital foramen. The flap thus formed was dissected upwards to the margin of the orbit, and the dissection was extended still farther, so as to expose half an inch of the osseous floor of the orbit. There was some difficulty in finding the foramen, and in insulating the nerve, owing to the matting of the tissues, as well as to the extensive and hard cicatrices, resulting from the previous operations, performed at the same point. The nerve, at its exit from the foramen, being found, with the hammer and chisel, a portion of bone was detached from the margin of the orbit, so as to remove the upper semi-circumference of the foramen infra-orbitale. Another piece of bone was now easily removed from the anterior part of the infra-orbital canal, and a portion of the trunk of the nerve was thus exposed. The nerve was easily detached from the canal at this part, and about a quarter of an inch of its trunk was exsected rapidly with the scissors.

Although chloroform was very freely administered, it was found almost impossible to keep up the anæsthetic influence sufficiently to annul the pain. While apparently insensible, when the nerve was touched with the instru-



ments, he would start violently, uttering a fearful shriek, and would become almost immediately perfectly conscious.

This operation by excision effected a greater degree of immunity from the severe symptoms than had been afforded by the mere division or incision of the nerve. Up to this period, from the time of the first attack, the patient had not been able to eat or drink without starting the severe pain in the face; the neuralgic paroxysms now, however, were not incited by the act of swallowing. In fact, the relief was immediate, and the disease seemed to be cured.

This relief from suffering was not of long duration. In February, 1856, the paroxysms were again renewed with as much intensity as ever, and the patient again demanded another operation. His condition was one of desperation, and justified a resort to any means which held out the slightest probability of success. I proposed to him, explaining the nature of the operation, to lay open his face, trepan the antrum maxillare, separate the trunk of the second branch of the fifth pair from its connections, as far as the posterior part of the antrum, and then to exsect a still larger portion of the nervous trunk. An eager and ready assent was given to this suggestion, and on the 21st of February, 1856, I accomplished the operation in the following manner: An incision was made, commencing opposite the lower border of the left orbit, below the inner angle of the eye, and carried downwards and outwards, so as to terminate at a point about half an inch below the infra-orbital foramen; another incision, beginning at the lower border of the orbit, and below the outer angle of the eye, was made so as to join the lower extremity of the first. At the junction of these two incisions, a sharp-pointed straight bistoury was now thrust through the cheek, and the upper lip divided entirely, midway between the median line and the labial commissure. The V-shaped flap first made was dissected upwards, and the other flaps were thrown inwards, towards the nose, and externally over the malar bone. The fore part of the antrum maxillare, and lower margin of the orbit were thus freely exposed. The situation of the foramen infra-orbitale was easily ascertained, and the crown of a trephine, three quarters of an inch in diameter, was applied upon the anterior wall of the antrum; the trephine grazing the lower border

of the foramen. A portion of bone was thus removed, so as to expose the cavity of the antrum. The membrane lining this cavity was found to be thick and velvety, and to present a dark maroon color. The anterior portion of the trunk of the nerve was sought for and found. With a hammer and delicate chisel the infra-orbital canal was laid open, and the nerve detached from its bony wall, as far backwards as the posterior wall of the antrum. The operation was finished by exsecting, by a rapid movement of the scissors, to the extent of about an inch, the nervous trunk thus laid bare and exposed. A pledget of dry lint was placed in the antrum, and the various incisions brought together by means of the Carlsbad pins as sutures.

Notwithstanding the complete anæsthesia under which the patient was kept, he would, frequently, when the trunk of the nerve was touched with the forceps or chisel, jump from the chair, as if struck by a powerful shock of electricity.

After this operation the unfavorable symptoms again disappeared, and the patient flattered himself that a cure had been effected. The paroxysms, with the exception of an occasional *tic*, abated, and he had such confidence in his recovery, that he accepted an offer to visit Panama, New Granada, to engage again in business.

On the 20th September, 1856, he left the United States, and arrived at the Isthmus of Panama during the following month. Six months were passed there without any annoyance from the disease. In the month of March, 1857, after exposure to cold, and sleeping in a damp atmosphere, the pain again appeared with much severity. It now seemed to commence from a point in the upper maxilla, opposite the alveolar border, where the first incisor tooth had been extracted, and to dart backwards, with great acuteness, towards the spheno-maxillary fossa. The paroxysms of pain were as severe, although not so diffused, as those by which the disease was ushered in.

Forbes was again forced to relinquish his business, and sailed for New York city, where he arrived in the latter part of April, 1857. He paid me a visit, and related to me the story of his recent attack, with an air and expression of utter despondency. In fact, he was again laboring under all the symptoms of *Tic Douloureux*.



On the 20th of April, at his earnest request, I performed another operation on him. This consisted in dissecting back the tissues of the cheek, and exposing the antrum maxillare. By the use of Lür's bone-cutters, I cut away the outer and lateral wall of the antrum, as low down as the alveolar margin of the bone, so as to destroy the loop of nerves which results from the anastomoses between the branches of the posterior and anterior dental nerves. This operation, (the tenth,) was of very little avail.

During the following three months, he resorted to the free use of narcotics, for the purpose of annulling the pain. In September, 1857, Forbes again entreated me to do something for his relief, and I dissected the cheek from the bone, by dividing the cicatrices which had been recently formed. This afforded temporary relief, resulting probably from the local depletion.

The cheek and left upper lip were now insensible to the touch, and the spasms were aroused by eating or swallowing; or they occurred spontaneously. The pain was referred, chiefly, to the upper maxillary bone, commencing at the point where the two left incisors had been extracted, and darting backwards, in different directions, towards the base of the skull. A few days only of partial relief followed, when the pains were renewed with such severity, that Forbes again besought another attempt, to procure some amelioration of his suffering.

From the failure of the operation by which about an inch of the trunk of the second branch of the fifth pair of nerves had been removed, it occurred to me that the portion of the trunk which was left must be still in a diseased condition, and that the train of neuralgic phenomena which were manifested, was to be referred to the peripheric ramifications, emanating from the ganglion of Meckel, and also to those branches which emanated from the small portion of the trunk of the nerve still remaining in front of the *foramen rotundum*.

As Forbes' case at this time presented itself, I was unwilling to cut down again through the cheek, and seek for the remaining stump of the nerve, in order to exsect this as well as the ganglion of Meckel. With a faint hope of mitigating the disease, on the second of October, 1857, I again laid bare the antrum, and the bones of the cheek, by making, through

the soft parts of the cheek and through the lip, the same incisions which had been made in my second operation, for exsection of a portion of the trunk. With Lüer's bone forceps, I then cut away the remaining portion of the anterior and lateral portions of the antrum, with a part of the posterior wall of this cavity; removing a part of the alveolar border of the upper maxilla, so as to encroach partially upon the vault of the mouth; while, towards the nose, the portion of bone opposite the two left incisors was removed, as well as a considerable portion of the ascending process of the superior maxilla. By this operation, it was intended to destroy still further the several nervous branches, running through the texture of the bones of the face, on the affected side. A dossil of lint was laid in the cavity of the wound, and the lips of the incisions brought together by the twisted suture. The wound healed, but a free communication remained from the mouth with the antrum, between the cheek and the edge of the vault of the mouth.

As before, a cessation of the symptoms followed the operation. But, the paroxysms returned in a few weeks; with tempered severity, however, and at longer intervals. When the pain did not start as if spontaneously, impressions made upon the nasal, buccal, or pharyngeal mucous membrane, appeared to be the exciting or immediate source of the paroxysms. It is upon those surfaces that the peripheric extremities of the branches, which take their origin from the ganglion of Meckel, are distributed. In order, therefore, to change the sensibility of the mucous surface, I began to cauterize freely, upon alternate days, the mouth and pharynx, as well as the antrum and cavity of the nostril, with a strong solution of nitrate of silver, by injecting the solution into the antrum from the mouth, through the communicating passage now existing. By these means, and the occasional use of narcotics, the patient obtained very great relief.

In addition to the action of the nitrate of silver upon the mucous surfaces just mentioned, on the 3d January, 1858, a seton was introduced into the back of the neck, on the left of the mesial line, for the purpose of maintaining a continued revulsive influence in proximity to the fifth pair of nerves. From this time, also, ten grains of quinine were daily administered internally. During the twelve months following the last operation (October, 1857), Forbes had



comparative immunity from his disease ; occasionally, however, he would be attacked with sharp shocks of pain, suddenly passing through the left side of the face. He had also returned to his business, and eat, drank, and slept with comfort.

This respite from suffering was interrupted on the 15th October, 1858, when he had, after exposure to cold, some severe and sharp paroxysms. These were excited, principally, by the act of swallowing either fluid or solid articles of food. After continuing for two days, the paroxysms ceased, under the influence of a cataplasm of stramonium leaves, and the tincture of aconite administered internally. At the date of November 4th, 1858, he was so well that he was about to resume his business, and on the preceding Tuesday he went to the polls to deposit his vote as an elector.

Notwithstanding his ameliorated condition, it cannot be said that this patient is cured. It is not improbable that he will be liable at times to be attacked with paroxysms of his disease.

The operation for removal of about an inch of the trunk of the second branch of the fifth pair—that most likely to remedy the disease—has failed to effect a cure. There still remains about half an inch of the trunk of the nerve, in front of the ganglion of Meckel, with some branches coming from this portion. If, at any time, the stump of the nerve thus remaining should become inflamed or irritated, by the law which governs the transmission of nervous sensibility, the localization of the pain would be referred, in a great measure, to the periphery of the branches which spring from the remaining part of the trunk, as well as of those springing from the ganglion of Meckel. Moreover, the pain may also be referred to the cheek itself, and to those other parts which were supplied by the lateral and terminal branches of the portion of the trunk removed ; upon the same principle which we see illustrated after amputation of the extremities—of the thigh, for example—where, after the removal of the limb, the patient complains of pain in the foot, *i. e.*, at the former periphery of the nerves of the stump.

The portion of the trunk of the nerve removed last, was about an inch in length. It was found to be red, irregular, and enlarged ; presenting near the middle a spot of yellow degeneration. [*Vide Plate No. IV, Figs. 1, 2.*]

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I have been thus particular in relating the details of this case, on account of its remarkable character—remarkable on the one hand, for its duration and protracted course, and on the other, for the perseverance and courage displayed on the part of the patient. The facts, also, which were developed during the different stages of the treatment, led me to project an operation for the cure of neuralgia of the second branch of the fifth pair of nerves, which is novel, and which I believe to be the only one capable of curing this affection.

This operation consists in exsecting the trunk of the second branch of the fifth pair, beyond the ganglion of Meckel, and, at the same time, removing this ganglion, or insulating it and its branches from the encephalon.

The phenomena of Tic Douloureux, I believe, can be explained by referring them to the laws which govern the transmission of sensibility, and to the anatomical distribution of the numerous ramifications of the fifth pair of nerves. The intricate and almost infinite anastomoses of these ramifications must also be taken into consideration, in the analysis of the phenomena of this terrific malady. The gray matter, also, of which the different ganglions connected with the several branches of the fifth pair, are composed, must exert considerable influence, by intensifying the sensibility; because they supply a continual flow of the *vis nervosa* along the nervous cords, and the net-work which they form.

While the case of Forbes was under my supervision, other cases of a similar character were presented to me for my advice. In several instances I performed the operation of exsecting the trunk of the nerve, as above stated, and in each instance with a satisfactory result. In the following pages an account is given of three cases, treated by exsection of the entire trunk, which I have transferred from *The Am. Journal of Med. Sciences*, of January, 1858, without alteration.



EXSECTION  
OF THE  
TRUNK OF THE SECOND BRANCH OF THE FIFTH  
PAIR OF NERVES,  
BEYOND THE GANGLION OF MECKEL,  
FOR  
SEVERE NEURALGIA OF THE FACE;  
WITH THREE CASES.

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THE accounts of neuralgia of the face, or *tic douloureux*, heretofore given by authors, are of a very vague and indefinite character. Numerous essays and monographs have been written on this subject, since the time of Fothergill, who published, in 1776, an elaborate description of the disease, which attracted considerable attention. In all these efforts, the pathology of *tic douloureux* is described with ambiguity. In practice the treatment has been as empirical, as it has proved to be unsuccessful. The seat of the disease has been referred to distant irritations, especially in the splanchnic cavities—to a foreign body acting upon the nerve—to the pressure of bone upon some portion of the nervous trunks. By some authorities, it is referred to increased vascularity and thickening of the nerves; while Astley Cooper, on the contrary, states, that the nerves present their natural color, and are rather diminished in size than enlarged. It can scarcely be supposed that beneficial results should follow from treatment based upon theories so different in character.

*Tic douloureux* of the face, proper, or of the second branch of the fifth pair of nerves, is by far the most common form of facial neuralgia. This may be explained by the more numerous branches, which are given off by this trunk, and by the position which these branches occupy—in some places pent up in osseous canals, and in others subjected to exposure, to changes in temperature, as well as to the agency of morbid influences, from which the other two trunks of the fifth pair are exempt.

The same laws which govern neuralgic disease of one of the branches of the fifth pair must be applicable to the disease in the other trunks. I believe that the phenomena of neuralgia can be explained with as much precision, as in any other disease which is well understood. In cases similar to those described below, whatever may have been the original exciting cause, I have no doubt that the real seat of the disease is in the trunk of the nerve, in front of the *foramen rotundum*—in some part of it, or in the whole of it. The causes of the disturbed and changed condition of the trunks of the nerve may be numerous—prolonged irritation upon the periphery—exposure—injuries—tumors—diseases of the teeth—pressure resulting from periosteal or osteal thickening of the osseous foramina or canals—sudden suppression of any of the important secretions, as of the catamenial discharge. From one or more of these causes, the trunk itself may be primarily affected, or, acting upon its ramifications, the irritation may be propagated to it. Prolonged irritation induces inflammation, and this generally remains passive or chronic. Some of the terminations of inflammation—such as the effusion of lymph among the interstices of the neurilemma or the nervous tissue itself—may become developed; leading to a vascular, engorged, thickened and enlarged condition of the nerve, or to a softening of it, at one or more points. In fact, vascular engorgement, or inflammation, with some of its consequences, of the neurilemma alone, or of it and the nerve together, by whatever cause produced, is the condition which constitutes the pathological changes in the trunk.

The three cases related below afford proof of what has just been stated. In each instance, the exsected nerve was found to be red, vascular, engorged, and considerably enlarged.

The diffused character of the pain can be easily understood, if we take



into consideration the numerous ramifications of the second branch of the fifth pair, and the extensive surface over which their ultimate filaments are distributed. The periphery of the nerve occupies not only the superficial parts of the face, but extends deep amongst the bones of the upper jaw, to the nasal fossæ, to the septum nasi, to the hard and soft palate, to the pharynx, to the inner ear, to the orbit, and to the temporal and malar regions.

It is well established, that if the trunk of a nerve be irritated along its course, the painful sensation will be referred to its periphery. If the ulnar nerve, for example, be struck where it passes behind the internal condyle, a sensation of pain is excited, which is referred to the little finger and to the ulnar border of the ring finger; and if a prolonged irritation be kept up at this point, the skin of these fingers becomes tender to the touch, the sensibility being very much increased. The pain which is felt, at the knee, in *Morbus Coxarius*, also illustrates this law. "The obturator nerve," Sir Charles Bell remarks, "passes through the thyroid foramen, down to the hip-joint, and, after supplying the muscles, is distributed upon the inner part of the knee. The nerve in its course is thus involved in the inflammation which affects the hip-joint, and the pain is referred to its extreme cutaneous branches, at a part distant from the seat of the disease."

It is by this principle—which governs the action of the stimuli upon the nerves of sensation—in connection with the anatomical distribution of the nervous ramifications, that the various phenomena of neuralgia can be explained. The disease being seated in the trunk of the nerve, we can readily understand that the pain must be referred to the peripheric extremities of the nerves, and will there be felt, as long as the branches are in communication with the encephalon.

From these views, we can see how futile the operation of division of the nerve at the *foramen infra-orbitale* must be. Where the trunk of the nerve is extensively diseased, no operation can rationally lead to a successful result, unless all the branches emanating from the trunk are cut off from communication with the brain.

I believe that in such aggravated cases of neuralgia, the key of the operation is *the removal of the ganglion of Meckel, or its insulation from the encephalon*.





Portion of the Trunk of the second Branch of the Fifth Pair of Nerves,  
removed from Forbes.

Fig. 1.

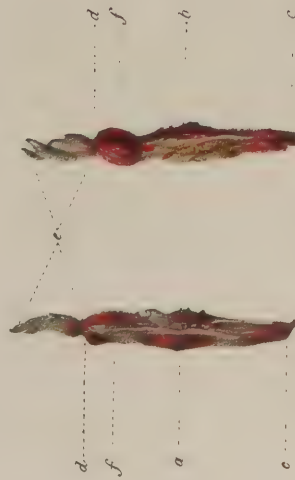
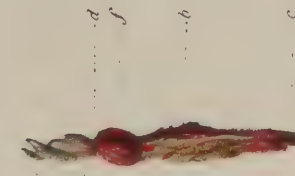


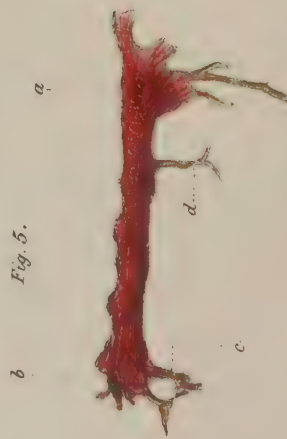
Fig. 2.



a. Upper surface. b. lower surface. c. Cranial extremity. d. Facial extremity. e. Portion of condensed tissue taking the place of the piece of Nerve first removed, with nervous fibres apparently prolonged in it. — f. The Nerve enlarged at this extremity. — The Neurilemma is seen red & engorged.

Trunk of the second branch of the Fifth Pair  
excised from Cordillo.

Fig. 5.



The Nerve is seen enlarged and engorged. a. Facial extremity. — b. Cranial extremity. c. Branches forming the ganglion of Meckel. d. Anterior branch coming from the Trunk, in the infra-orbital canal.

Left trunk of the second branch of the Fifth Pair  
excised from D<sup>r</sup> Rousset.

Fig. 3.



Fig. 4.



The Nerve is seen vascular, engorged and enlarged. a. Upper surface. b. Lower surface. — c. Facial extremity. — d. Cranial extremity. — e. Ramifications from the trunk, given off in the infra-orbital canal, passing to the face and surrounded with adipo-cellular tissue.

Nerve removed in Case 3 —  
red thickened and irregular.

Fig. 6.



a. Facial extremity. — b. Cranial extremity. — The Neurilemma is partially removed.







*phalon*. Where even a large portion of the trunk of the second branch of the fifth pair has been simply exsected from the infra-orbital canal, the ganglion of Meckel continues to provide, to a great extent, the nervous ramifications, which will still maintain and keep up the diversified neuralgic pains. Besides, the ganglion of Meckel, being composed of *gray matter*, *must play an important part as a generator of nervous power*, of which, like a galvanic battery, it affords a continual supply ; while the branches of the ganglion, under the influence of the diseased trunk, serve as conductors of the accumulated morbid nervous sensibility.

CASE I.—Henry Rousset, a French physician, residing in Greensborough, Caroline county, Maryland, consulted me in the early part of October, 1856, for severe neuralgia, which had for several years rendered him incapable of following his profession. He was of nervous temperament, good constitution, and sixty-nine years of age.

The disease first made its appearance in September, 1851, commencing with severe lancinating pains about the region of the left cheek and orbit. These pains continued for five or six days, and then disappeared, leaving him almost free from them for about four months. At the expiration of that time, the neuralgic pains again returned, with more violence, extending over the region of the left cheek, and continuing, almost without intermission, for more than a week. After this exacerbation, the patient again became comparatively free from pain for a short interval ; after which, the attacks returned with increased severity, and were renewed with greater frequency, more especially in the cold season, and in damp weather. As the disease progressed, the pain was not confined alone to the eye and cheek, but would also attack the lip and nose ; each paroxysm being of longer duration than the preceding. With but slight variation, the disease went on in this way to harass and distress the patient for four years. About the commencement of March, 1856, the neuralgic exacerbations assumed a more violent form, marked by excruciating and almost unremitting suffering. He was, at this time, unable to eat, drink, converse, or laugh, without having a most violent paroxysm, causing him to shriek in anguish. The paroxysms were more severe during the night than day ; sleep left him ; his constitution began to give way, and his



mind became much enfeebled. The slightest touch upon the surface of the face, a current of air or a mouthful of water acting on the palate, would throw the patient into a violent paroxysm of agony. During this long period of suffering, all the known remedies which have at times been extolled for neuralgia of the face had been tried—narcotics, tonics, anti-spasmodics, with counter-irritants, and galvanism—without producing any appreciable result. In this distressed condition, the patient, wearied of existence, and unable any longer to endure a life so made up of excruciating torture, presented himself to me for my advice, at the beginning of October, 1856. He expressed himself willing to undergo any operation, however severe, which held out the prospect of relief. Having no internal remedy to propose which had not already been administered, and having no faith in the mere division of the nerve upon the face, I proposed to him the exsection of the trunk of the second branch of the fifth pair of nerves to a point beyond the ganglion of Meckel. Being a physician himself, I explained at length my views, (as expressed above,) in regard to this malady. He immediately consented to have the operation performed, and desired that a near time should be appointed. I consequently agreed to perform the operation the following day, the 16th of October.

*Operation.*—The principal instruments necessary for this operation are a trephine, the crown of which is three-quarters of an inch in diameter, an elevator, chisels of different shapes and sizes, a leaden or iron mallet, the bone forceps of Lüer, small pieces of sponge tied to a stick or a piece of whalebone, and a small fixed trephine of half an inch in diameter, which may be used to perforate the posterior wall of the antrum. The assistants being properly arranged, the patient was seated upon a solid chair, opposite a good light, and was put under the influence of chloroform. The head was rested upon the breast of an assistant, who maintained it in position. An incision was now made on the cheek, commencing near the internal angle of the eye, on the inferior edge of the orbit, opposite the anterior lip of the lachrymal groove. This incision was carried downwards and slightly outwards, for about an inch, to a point opposite the furrow on the lower portion of the ala of the nose; another incision, terminating at the

same point, commenced about half an inch below the external angle of the eye, opposite the edge of the orbit; thus forming a V incision, in the area of which is situated the *foramen infra-orbitale*. The flap thus resulting was thrown upwards, and the branches of the second branch of the fifth pair of nerves sought for: some of these being found, they served as a ready guide to the trunk of the nerve. This was now insulated from the surrounding tissues up to the point of exit upon the face from the foramen. The lip was now everted, and the mucous membrane detached from the superior maxilla, along the line of junction between the cheek and the gum. A sharp-pointed bistoury was now inserted into the mouth, at the apex of the V incision, and carried downwards, so as to divide entirely the tissues of the cheek and upper lip, along a line passing midway between the ala of the nose and the commissure of the lips. The two flaps, thus formed, were now dissected from the osseous tissue beneath; one being reflected outwards, towards the ear, the other internally, towards the nose. The whole front wall of the *antrum maxillare*, with the nerve passing through the *foramen infra-orbitale*, was thus exposed. The crown of the trephine was now applied on the anterior wall of the antrum, immediately below the *foramen infra-orbitale*, and an irregular disk of bone removed, so as to expose freely the cavity of the antrum. The circumference of the foramen, the hardest portion of the *canalis infra-orbitalis*, was now destroyed by Lürer's forceps, and a small chisel. The trunk of the nerve was now traced along the osseous canal in the floor of the orbit, which was broken down with care, so as not to encroach upon the tissues in the cavity of the orbit. Arriving at the back of the antrum, the posterior wall of this cavity was broken down with a small chisel, and the portions of bone removed. The trunk of the nerve was now still further insulated from the other tissues in the *spheno-maxillary fossa*. The posterior dental nerves being divided, and the dissection being carried still further, the branches given off to form the ganglion of Meckel were reached. These were divided, and also the branch given off to run up towards the orbit. Lastly, by the use of blunt-pointed scissors, curved on the flat side, the trunk of the nerve was divided from below upwards, close up to the *foramen rotundum*. The hemorrhage was not very profuse, the labial arteries being easily controlled by



pressure of the fingers, and the branches of the internal maxillary artery, in the *spheno-maxillary fossa*, by dry lint, or, what is better, the compressed sponge. The lips of the wound were brought together and maintained in place by thirteen points of twisted suture, the German or Carlsbad pins being used.

This severe and trying operation is perfectly justified by the fearful nature of the disease for which it was projected. It is one of those operations which could not be supported by the patient without the influence of chloroform. The handling of so large a nervous trunk with the forceps, and the necessary contact with the hard instruments, while separating it from its surrounding connections, would, I suppose, be beyond human endurance, without the aid of the anæsthetic influence of chloroform or ether. For the rest, the effects of the cicatrices upon the countenance can scarcely be called disfiguring, and the patient speedily recovers, without suffering from much constitutional disturbance.

In this operation, and in those connected with the two succeeding cases, I was assisted by my colleague Prof. Cox, by Drs. Proudfoot, Abrahams, Selden, Guleke, and Casseday; and by my pupils, Messrs. Dougherty, Scudder, and others.

*Condition of the Nerve.*—The trunk of the nerve, in this case, was much larger than natural, in nearly its whole extent. The neurilemma was very vascular, and the nervous tissue proper was also engorged and red: the trunk, after its removal, was so red as to have somewhat the appearance of muscular tissue. The length of the nerve removed was a little more than an inch and three-quarters. The lining membrane of the antrum was sound, as well also as the bones of the antrum and the osseous wall of the *canalis infra-orbitalis*. [*Vide Plate IV., Figs. 3 and 4.*]

*Progress of Union and After-treatment.*—Oct. 16th. Six hours after the operation, the patient was visited. His pulse was 100; there was a slight fever; he complained of thirst, and lemonade was ordered. He spoke of a desire he had to vomit, which he ascribed to the chloroform. He stated that he felt slight twitchings on the nose, and at the corner of the lip.

17th (Friday). The patient was remarkably well under the circum-

stances; sitting up; pulse 90; tongue lightly covered with a white fur; complained of pain in the wound, also of shooting pains in the left eye; he remarked that he could stick a pin into the upper lip and cheek without causing pain, there being no sensation in that region. Ordered chicken broth, and wine and water.

18th (Saturday). Patient improving; wound healing; pulse natural; no fever; spoke of the numbed sensation in his face.

19th (Sunday). Pulse full and natural; good appetite; partook of a beefsteak; in the afternoon four suture pins removed; slight pain in the wound; no return whatever of the neuralgia.

20th (Monday). Cure progressing; healthy suppuration from wound; appetite excellent; general health much improved.

(Tuesday, Wednesday, Thursday.) During these days the rest of the pins were removed; patient felt no pain whatever either in the wound or cheek; wound in the antrum syringed with tepid water.

25th (Sunday). Patient attended church; felt no pain whatever; incision of the upper lip and cheek entirely healed.

28th. Patient entirely well.

30th. Returned home to Maryland in high spirits, and delighted at the result of the operation.

December 7th, 1857. Fourteen months after the operation he writes to me that he is enjoying excellent health, and has been entirely free from neuralgic pain.

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CASE II.—Florence Cordello, a native of Italy, aged 54 years, of lymphatic temperament, chocolate maker by trade, was admitted to the State Hospital on the 14th of September, 1857, suffering from severe *tic-douloureux* of the left side of the face. The following is the account handed to me by the Assistant Surgeon, Dr. Guleke. In the year 1828, the patient contracted a very severe cold from exposure, and about this time he was seized with the pain for the first time. According to his own description, the pain started from the *foramen infra-orbitale*, extending upwards to the forehead,



and downwards into the teeth ; the paroxysm lasting about ten minutes. He supposed it to be toothache, and had one or two teeth extracted. An interval of eight years took place, when he was again attacked with neuralgic paroxysms, lasting from five to ten minutes. Again, after the lapse of a year, the paroxysms reappeared in a more severe form, and at shorter intervals.

The patient, still believing his teeth to be the source of the disease, had all of them extracted on the left side of the upper jaw, but without any benefit. During these attacks he had been subjected to many kinds of treatment, both internally and externally : he also repaired to some of the mineral springs on the Rhine, but still to no purpose. He continued thus to suffer more or less intensely from the neuralgic paroxysms, for a period of time extending from 1837 to 1846, and with detriment to his general health. In 1846, while passing through the city of Heidelberg, in Germany, he consulted the celebrated Chelius with the hope of obtaining some beneficial result from his advice. That professor divided the nerve as it emanated from the *infra-orbital foramen*, by incisions from the mouth ; and, six weeks after, again performed the same operation, without any favorable result. During the next six years the patient continued to suffer from neuralgic paroxysms of more or less intensity.

Oppressed by extreme suffering, he again sought relief from an operation, and in 1852 the nerve was again divided from the mouth, by forcing up the lip ; the actual cautery being at the same time applied, by pushing the instrument from the mouth upwards into the wound, as far as the *foramen infra-orbitale*. This operation appeared to give some relief, and during the two succeeding years the patient's sufferings were somewhat alleviated. About two years ago, the paroxysms returned in the most aggravated form, progressed, and continued without much abatement. On the 1st of September last, being in New York, he again submitted to an operation for division of the nerve. This time, the branches of the nerve were divided by cutting through the integuments, directly upon the infra-orbital foramen ; an operation causing no other effect than insensibility to the touch in the soft tissues near the infra-orbital foramen. Two weeks after this, he entered

the State Hospital. The condition of the patient was then as follows: Notwithstanding the repeated division of the nerve, there was sensibility to the touch over the whole region of the cheek; the inner side of the lip alone appearing to be insensible. The patient describes the pain as starting from the *foramen infra-orbitale*, extending up as far as the *ligamentum palpebræ internum*, and also to the external corner of the eye: from the latter point, the pains shot down in nearly a straight line to a point about one inch to the outside of the left corner of the mouth, and a little below a line drawn horizontally on a level with the commissure of the lips. The pains, also, extended backwards, through the more deeply-seated portions of the face, shooting from the inner corner of the eye, along the base of the nose, and striking backwards towards the *spheno-maxillary fossa*. The pain was of the true neuralgic character, and so intense as to drive the patient into a condition verging on delirium. A slight touch on the cheek, the inside of the mouth, or on the hard or soft palate, swallowing, or speaking, excited almost instantaneously the paroxysms in their severest form.

*The Operation.*—The operation in this case was performed after the same manner as the preceding, and was modified only by the greater depth of the antrum and face. There was also more hemorrhage from the spheno-maxillary fossa; this was controlled by compressed sponge pressed into the fossa. Supposing the hemorrhage might return, the lips of the wound were brought together by adhesive plaster, one suture only being used. The other sutures were inserted the following day. The nerve was cut from above downwards. The ganglion of Meckel was drawn out, hanging to the trunk of the nerve.

*Progress of Union and After-treatment.*—Compressed sponge was applied in the deeper portion of the wound; the external surface was closed with one suture; an anodyne was ordered for the night.

Oct. 11 (Sunday). Patient slept well during the night; pulse 76; no bleeding; five suture-pins applied; ordered an anodyne.

12th. Patient slept well; no pain whatever; pulse 84; complained of thirst; but little appetite; spoke and swallowed without pain.

13th. Slept badly; had an attack of dysentery; pulse 96; felt a slight pulsating pain in the wound, which, however, was doing well; stated that



there was no feeling over the surface of the left cheek, from the inner angle of the eye, descending along the nose to the lip, and upwards to the outer angle of the eye, including the lower lid; ordered opium and quinine. (*Afternoon*), dysentery subdued; pulse 96; more cheerful.

14th. Patient improving; pulse 92; a number of the pins removed.

15th. Remaining pins removed; wound presented a healthy appearance; pulse natural; slight pain felt in the course of the wound.

16th. Removed the piece of compressed sponge, which had been placed at the back of the antrum, during the operation, to restrain the bleeding from the spheno-maxillary fossa.

18th. Patient doing well; eat well, and slept naturally.

26th. Still entirely free from neuralgic pain; the whole expression of the face changed from that of suffering and anxiety, to cheerfulness and serenity.

28th. Discharged from the hospital entirely cured, and in good health and spirits.

Dec. 8th. Visited the hospital; still free from pain, and in good condition.

*Condition of the Nerve.*—The nerve in this case exhibited the same appearance as in the previous one. It was thickened, vascular, and engorged. The neurilemma and proper tissue of the nerve were both affected. The length of the trunk removed was two inches. [*Vide Plate IV., Fig. 5.*]

CASE III.—Mrs. Mary \* \* \* \* \* a native of Portsmouth, England, and who had borne children, 55 years of age, of full habit and sanguineous temperament, consulted me, in the month of September, 1857, for severe neuralgia of the left side of the face. She had been a resident of the Northern States for thirty years, and had enjoyed, generally, remarkably good health.

On the 12th of August, 1851, while eating a plum in her garden, she was suddenly seized with a vivid shock of pain, commencing on her cheek, and passing through her jaw, as if caused by a sharp-pointed instrument, sud-

denly driven through her face; shooting pains of this character, with intermissions of entire abatement, continued for several days. A dentist was consulted, who, attributing the symptoms to the teeth, extracted several of them, but without the slightest benefit to the patient. The paroxysms continued, with more or less severity, for two months.

At the end of this time, they suddenly abated in their severity; the respite lasting for about six weeks. Upon hearing of the sudden death of a friend to whom she was much attached, the paroxysms were again renewed, with greater frequency; the intensity of pain increasing more and more with each succeeding attack. During the year 1852, the pain and paroxysms still continued with unyielding severity. The *tic* would now last for two and three months, with scarcely any of the intervals which had heretofore occurred. Cold air, the drinking of fluids, the slightest touch upon the cheek, or any sudden mental emotion, would invariably excite the most fearful paroxysms. During the year 1854, her condition was not in any way ameliorated; the pain, if possible, was more severe, and her general health suffered from the want of rest. During the year 1855, the disease progressed with the same severity. In the early part of the year 1856, the paroxysms became still more aggravated; the patient, at times, becoming almost delirious—starting up, running about her room, and screaming like a maniac. In the latter part of September, she sought relief from a surgeon in this city, who divided, by subcutaneous incision, the branches of the infra-orbital nerve, as it issues from the infra-orbital foramen.

About this time, she also took large quantities of various narcotics, and of the carbonate of iron. After the operation, she experienced some relief. The amelioration continued from October, 1856, until May, 1857, when the paroxysms were again renewed in their severest form.

The pain now became almost continual, depriving her nearly entirely of sleep; she was unable to eat without torture, the act of swallowing invariably bringing on a paroxysm. During these exacerbations, the pain was diffused in different directions, extending from a point a little below the infra-orbital foramen, or from the ridge of the gums, and striking through the superior maxillary bone, towards the deeper portions of the face, and towards



the orbit; and sometimes extending towards the region in front of the ear. She described the pain as of a beating character at times; each shock succeeding another in rapid succession, as if keeping time with the ticking of a clock. During this long period of suffering, she had been under the alternate care of several physicians; the various remedies most approved of in this kind of disease had all been faithfully and sedulously tried; stramonium, aconite, belladonna, hemlock, opium, morphia, chloroform, carbonate of iron, valerianate of ammonia, and other medicaments had been administered internally; while externally, in addition to the division of the nerve, blisters, sinapisms, hydrocyanic acid liniment, tincture of aconite, and chloroform had been resorted to—also electricity and galvanism. At the time I was consulted, she was suffering night and day from repeated and excruciating attacks, and, as she herself stated, she had visited the city to have an operation performed at all hazards, however desperate it might be, if I could only hold out any prospect whatever of its affording relief. Her general health was tolerably good, and she did not complain of loss of appetite. I explained to her the nature of the operation, which I believed to be the only one suited to her case. She immediately assented to submit to it as early as possible.

The *operation* was performed after the same procedure as heretofore described. The face was in this instance, also, very deep. The hemorrhage from the spheno-maxillary fossa was considerable, and was stopped by a piece of compressed sponge, to which a strong ligature was attached, by which it could be removed.

*Progress of Union and After-treatment.*—Nov. 5th (Thursday evening). As soon as the operation was completed, the patient retired to her bed. Vomiting came on a few hours after, owing, probably, to the quantity of chloroform which had been used.

6th. Had slept tolerably well during the night; felt very little pain; pulse 80; no fever; complained of some pain in the wound, but had no neuralgic pain.

7th. Left side of the face slightly swollen; puffiness about the eyelids; has no pain; has slept well without any anodyne; states that she feels bet-

ter than she has for months; pulse 80; skin natural; slight thirst; five of the suture pins removed; line of incision looks as though union by first intention was going on favorably. Still kept on fluids for nourishment—gruel, rice-water, ice-water, toast-water, and chicken tea. Ordered a gentle aperient.

8th. Had slept well; tumefaction of face subsiding; complains of headache; cloth wetted with cold water applied on forehead; same diet continued; pulse natural; removed the sponge which was used to stop the bleeding from the spheno-maxillary fossa; this came away without any difficulty by slight traction, a little blood following. Complains of slight pain in the orbit. Removed six suture pins, leaving one only—that uniting the free border of the lip. Fluid diet as before.

9th. Patient slept well; headache less; pulse 78; no neuralgic pain; a weak solution of the tincture of arnica ordered, to bathe the cheek with; removed the last pin; union by first intention, along the line of incision, complete.

From the 9th until the 16th all has progressed favorably. No neuralgic pain whatever; sleeps well; swelling on cheek diminishing; pain has entirely left the orbit; secretion into the mouth from the wound in the antrum diminished. Ordered a gargle of the tincture of myrrh. Appetite has also returned. Had been sitting up, and walking about her room without any inconvenience. Has taken a little sulphate of magnesia; has not required any anodyne.

Dec. 3d. The patient has been progressing favorably up to this time. The wound has healed entirely; the line of cicatrix is becoming effaced; not the slightest trace of tic douloureux remaining. There is no paralysis of the muscles of the face upon the side operated on.

In this case, the nerve was enlarged, very vascular, thickened and red. About two inches of the nerve were removed. [*Vide Plate IV., Fig. 6.*]



The bones of the cranium are liable to expansion, or thickening of their texture, from inflammatory action, most commonly dependent upon some constitutional taint. If the *os sphenoides* happened to be the seat of such disease, one or more of the foramina for the transmission of the nervous trunks might become very much contracted. A question might arise as to the effect of compression, from this cause, on the trunk of the second branch of the fifth pair, at the point where it is surrounded by the osseous sides of the *foramen rotundum*. From what has heretofore been stated, in relation to the law which governs the transmission of morbid sensibility along the trunk and branches of a nerve, subjected to an irritating cause, we should infer the supervention of neuralgia of the face, of the most severe character. In such a case, the operation of exsection of the trunk of the nerve, beyond the ganglion of Meckel, offers the best hope for relief; for, besides the removal of the trunk of the nerve, thus far, direct local depletion is obtained at the seat of the irritation; and, moreover, the portion of the nerve, placed in the foramen, will, most probably, become atrophied or diminished.

Pathological records corroborate the opinion which locates the seat of facial neuralgia on the nervous branches or trunks, after they have emerged from the encephalon.

After the section of the fifth pair of nerves, within the cranium, it is a well established fact that the *general sensibility* is annulled in the superficial and deep parts of the face; that their nutrition and their secretions are more or less perverted; and that the functions of the organs of *special sense* are disturbed. From this physiological fact, we arrive at the important diagnostic conclusion, that disease, involving the trunk of the fifth pair, and the ganglion of Gasser, so as to compromise its connections with the grand sympathetic, must be attended with pathological manifestations in the external organs of sense; the most remarkable of which are observed in the globe of the eye.

Cases illustrating this statement—important also in regard to the prognosis—are related by Herbert Mayo, Abercrombie, and others. The following case, published by M. Serres (*Anatom. Comp. du cerveau*, etc.), is to the point:

“ A droite, l'insensibilité de la conjonctive était telle qu'on pouvait passer entre les paupières et le globe de l'œil les barbes d'une plume sans que le malade s'en aperçût ; il y avait immobilité complète du globe de l'œil et de ses dépendances ; la narine droite était également insensible à l'introduction d'un corps étranger ; toutefois l'odorat n'avait pas complètement disparu. Le malade ne recevait aucune impression de l'application du sulfate de quinine sur la moitié droite de sa langue. Les gencives du même côté étaient molles, fongueuses, noirâtres, détachées des os. Il y avait eu successivement inflammation de l'œil droit, coarctation de la pupille, opacité de la cornée et enfin perte de la vue. L'ouïe était diminuée à droite quelques jours avant la mort. *A l'ouverture du cadavre, on trouva la cinquième paire ramollie à son origine, jaunâtre et presque gélatiniforme. Cette altération s'enfonçait à une ligne ou deux dans la protubérance annulaire. Le ganglion de Gasser, de ce côté était d'une ligne et demie plus large que du côté sain ; il était jaunâtre. Quant à la petite racine du trijumeau, elle était intacte.*”









